



BIOGRAPHICAL SKETCH

NAME: Davide Maria Ferraris Email: davide.ferraris@uniupo.it

POSITION TITLE: Associate Professor in Biochemistry – Università del Piemonte orientale – Novara (Italy)

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Università di Torino	Master Degree (Laurea)	03/2004	Chemistry
MMH Hannover/HZI Braunschweig	PhD	05/2008	Biochemistry/Structural Biology
HZI Braunschweig	Postdoctoral	10/2008	Biochemistry/Structural Biology
Università del Piemonte Orientale	Postdoctoral	12/2020	Biochemistry/Structural Biology
Università del Piemonte Orientale	Associate Professor	12/2021	Biochemistry/Structural Biology

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A. Personal Statement

I am a Professor in Biochemistry and Structural Biology at the Department of Pharmaceutical Sciences at the University of Eastern Piedmont in Novara (Italy). My research interests are focused on the structure elucidation of drug targets involved in cancer and infectious diseases, for the development of active compounds and of new drugs. I also work on the biochemical and structural analysis of protein-inhibitor complexes of *M. tuberculosis* enzymes for the development of new potential antitubercular drugs. Furthermore, I worked on the study of proteins involved in the *M. tuberculosis* host-pathogen interaction, in the Krebs cycle and in the metabolism of the purine and pyrimidine bases. More recently, I have been involved in the study of enzymes involved in oncogenic processes and in the study of proteins involved in the degradation of hydroxyproline, as well as in the structural and functional elucidation of host-pathogen protein-protein interactions of SARS-CoV-2.

I have published 35 research papers in peer-reviewed journals, and my current h-index is 18.

B. Positions, Scientific Appointments, and Honors

December 2021 – Present:

Associate Professor in Biochemistry and Structural Biology Unit of the Department of Pharmaceutical Sciences - University of Eastern Piedmont.

December 2018 – December 2021: Researcher at the Biochemistry and Structural Biology Unit of the Department of Pharmaceutical Sciences - University of Eastern Piedmont.

October 2018 – December 2021: Teaching activities at the Master's Degree in Biotechnology - Department of Health Sciences - University of Eastern Piedmont

October 2008 - December 2018: Research Fellow - Biochemistry and Structural Biology Unit of the Department of Pharmaceutical Sciences - University of Eastern Piedmont.

September 2004 - October 2008: International Marie-Curie (MIDITRAIN) PhD Program in Infection Biology. PhD title in "Infection Biology" at the Hannover Medical School (MHH) and held at the Helmholtz Centre for Infection Research (HZI, Braunschweig, Germany), at the Division of Structural Biology, under the supervision of Prof. Dirk Heinz.

October 1997 - March 2004: Degree in Chemistry - Organic Chemistry - University of Turin - Degree in Chemistry. Degree thesis: Analysis of isoenzymes of the catechol 1,2-dioxygenase of *Acinetobacter radioresistens*. Speaker: Prof. Carlo Giunta

Awards and research funding

October 2024 -October 2027

ASI - Italian Space Agency PhD grant

Total allocated budget: 105.000 €

October 2023 – November 2025

PRIN 2023 Grant – Progetto di Rilevante Interesse Nazionale – Ministero Università e Ricerca (MUR).

Total allocated budget: € 40.000.

March 2023 – March 2027 – Marie Skłodowska-Curie Doctoral Network "PROSTAMET"

I am leading partner of the European doctoral network "PROSTAMET" that aims to train the next generation of researchers tackling complex multifactorial diseases, including cancer.

Total allocated budget: 260.000 €.

July 2019 – "Local Research Grant"

My project was selected as the recipient of a competitive research grant of € 45,000 from the Department of Pharmaceutical Science

June 2019 - Artificial Intelligence Molecular Screen (AIMS) award

My project was selected for the "Artificial Intelligence Molecular Screening (AIMS) award", a public-private collaborative project for the development of molecules, active on molecular targets, using Artificial Intelligence (AI).

May 2019 - "100 Italian Excellences" Award

IXTAL srl, the company of which I am the co-founder and the General Manager, was selected by the "Italian Excellences Observatory" among the companies "representative of Italian excellence".

November 2017 - "Roche for Research" Award

Winner of the "Roche for research" award for the project "Analysis and optimization of molecules able to selectively bind the enzyme ALDH1A3, tumor marker of glioma cells, useful for the development of glioma-specific fluorescent drugs and probes". Prize value: € 100,000

Additional Information: Research Support and/or Scholastic

November 2008 - 2011 September: Participation as a Research Assistant in the research project "System of Biology Mycobacterium tuberculosis" funded by the European Community (SystemTb HEALTH-F4-2010-241587)

Co-editor of the MDPI special issue "*Mycobacterium tuberculosis* Pathogenesis, Infection Prevention and Treatment"; https://www.mdpi.com/journal/pathogens/special_issues/Mycobacterium_tuberculosis

Member of the Editorial Board of Structural Biology (specialty section of Frontiers in Molecular Biosciences and Frontiers in Cell and Developmental Biology) as a Review Editor

Member of the teaching board of the doctoral course "Drug Innovation", Department of Pharmaceutical Sciences, 2021

Lecturer for the "European Master in Translational Cosmetic and Dermatological Sciences – EMOTION" (<https://www.emotion-master.eu>)

C. Contributions to Science

Yunqing Li, Serena M. Arghittu, Marina S. Dietz, Gabriel J. Hella, Daniel Haße, **Davide M. Ferraris**, Petra Freund, Hans-Dieter Barth, Luisa Iamele, Hugo de Jonge, Hartmut H. Niemann, Roberto Covino & Mike Heilemann *Single-molecule imaging and molecular dynamics simulations reveal early activation of the MET receptor in cells* **Nature Communications** volume 15, Article number: 9486 (2024) DOI: <https://doi.org/10.1038/s41467-024-53772-7>

Marta Alberti; Giulio Poli; Luca Broggin; Stefano Sainas; Menico Rizzi; Donatella Boschi; **Davide M. Ferraris**; Elena Martino; Stefano Ricagno; Tiziano Tuccinardi *An alternative conformation of the N-terminal loop of human dihydroorotate dehydrogenase drives binding to a potent antiproliferative agent* **Acta Crystallographica Section D Structural Biology** 2024-06-01 DOI: [10.1107/S2059798324004066](https://doi.org/10.1107/S2059798324004066)

The Atomwise AIMS Program; Izhar Wallach; Denzil Bernard; Kong Nguyen; Gregory Ho; Adrian Morrison; Adrian Stecula; Andreana Rosnik; Ann Marie O'Sullivan; Aram Davtyan et al. *AI is a viable alternative to high throughput screening: a 318-target study*. **Scientific Reports**, 2024-04-02 ; DOI: [10.1038/s41598-024-54655-z](https://doi.org/10.1038/s41598-024-54655-z)

Alberti M, Sainas S, Ronchi E, Lolli ML, Boschi D, Rizzi M, **Ferraris DM**, Miggiano R. *Biochemical characterization of Mycobacterium tuberculosis dihydroorotate dehydrogenase and identification of a selective inhibitor*. **FEBS Lett.** 2023 Aug;597(16):2119-2132. doi: 10.1002/1873-3468.14680. Epub 2023 Jun 15. PMID: 37278160; <https://doi.org/10.1002/1873-3468.14680>

Sainas S, Giorgis M, Circosta P, Poli G, Alberti M, Passoni A, Gaidano V, Pippione AC, Vitale N, Bonanni D, Rolando B, Cignetti A, Ramondetti C, Lanno A, **Ferraris DM**, Canepa B, Buccinnà B, Piccinini M, Rizzi M, Saglio G, Al-Karadaghi S, Boschi D, Miggiano R, Tuccinardi T, Lolli ML. *Targeting Acute Myelogenous Leukemia Using Potent Human Dihydroorotate Dehydrogenase Inhibitors Based on the 2-Hydroxypyrazolo[1,5-a]pyridine Scaffold: SAR of the Aryloxyaryl Moiety*. **J Med Chem.** 2022 Oct 13;65(19):12701-12724. doi: 10.1021/acs.jmedchem.2c00496. Epub 2022 Sep 26. PMID: 36162075; <https://doi.org/10.1021/acs.jmedchem.2c00496>

Eugenio Ferrario, Riccardo Miggiano, Menico Rizzi, **Davide M. Ferraris** *The integration of AlphaFold-predicted and crystal structures of human trans-3-Hydroxy-L-proline dehydratase reveals a regulatory catalytic mechanism*; **Comput Struct Biotechnol J.** 2022 Jul 18;20:3874-3883; <https://doi.org/10.1016/j.csbj.2022.07.027>

Edoardo Gelardi, Diego Caprioglio, Giorgia Colombo, Daniele Mazzeo, Daiana Mattoteia, Stefano Salamone, **Davide M. Ferraris**, Eleonora Aronica, Giulia Nato, Annalisa Buffo, Menico Rizzi, Lorenzo Magrassi, Alberto Minassi, Silvia Garavaglia *Curcumin-based-fluorescent probes targeting ALDH1A3 as a promising tool for glioblastoma precision surgery and early diagnosis*, **Communications Biology** volume 5, Article number: 895 (2022); <https://doi.org/10.1038/s42003-022-03834-7>

Desole C, Gallo S, Vitacolonna A, Vigna E, Basilico C, Montarolo F, Zuppini F, Casanova E, Miggiano R, **Ferraris DM**, Bertolotto A, Comoglio PM and Crepaldi T (2021) *Engineering, Characterization, and Biological Evaluation*

Edoardo L M Gelardi, Giorgia Colombo, Francesca Picarazzi, **Davide M Ferraris**, Andrea Mangione, Giovanni Petrarolo, Eleonora Aronica, Menico Rizzi, Mattia Mori, Concettina La Motta, Silvia Garavaglia *A selective competitive inhibitor of aldehyde dehydrogenase 1A3 hinders cancer cell growth, invasiveness and stemness in vitro* **Cancers**, 2021, 13(2), pp. 1–20, 356; <https://doi.org/10.3390/cancers13020356>

M He, J Guo, J Yang, Y Yang, S Zhao, Q Xu, T Wei, **DM Ferraris**, T Gao, Zhigang Guo *A highly selective electrochemical assay based on the Sakaguchi reaction for the detection of protein arginine methylation state* **Electrochemistry Communications** 118, 106808; <https://doi.org/10.1016/j.elecom.2020.106808>

Miggiano R; Rizzi M; **Ferraris DM** *Mycobacterium tuberculosis Pathogenesis, Infection Prevention and Treatment* **PATHOGENS** 2020, 9(5), 385; <https://doi.org/10.3390/pathogens9050385>

Ferrario E, Miggiano R, Rizzi M, **Ferraris DM** (2020). *Structure of Thermococcus litoralis Δ 1-pyrroline-2-carboxylate reductase in complex with NADH and L-proline.* **ACTA CRYSTALLOGRAPHICA. SECTION D, STRUCTURAL BIOLOGY**, vol. 76, p. 496-505, ISSN: 2059-7983, <https://doi.org/10.1107/S2059798320004866>

Ferraris DM, Gelardi, ELM, Garavaglia S, Miggiano R, Rizzi M (2020). *Targeting NAD-dependent dehydrogenases in drug discovery against infectious diseases and cancer.* **BIOCHEMICAL SOCIETY TRANSACTIONS**, ISSN: 0300-5127, <https://doi.org/10.1042/BST20191261>

Quattrini, L, Gelardi ELM, Coviello V, Sartini S, **Ferraris DM**, Mori M, Nakano I, Garavaglia S, La Motta C (2020). *Imidazo[1,2-a]pyridine Derivatives as Aldehyde Dehydrogenase Inhibitors: Novel Chemotypes to Target Glioblastoma Stem Cells.* **JOURNAL OF MEDICINAL CHEMISTRY**, ISSN: 0022-2623
<https://doi.org/10.1021/acs.jmedchem.9b01910>

Quattrini L, Gelardi ELM, Petrarolo G, Colombo G, **Ferraris DM**, Picarazzi F, Rizzi M, Garavaglia S, La Motta C (2020) *Progress in the Field of Aldehyde Dehydrogenase Inhibitors: Novel Imidazo[1,2-a]pyridines against the 1A Family.* **ACS MEDICINAL CHEMISTRY LETTERS**, ISSN: 1948-5875, <https://doi.org/10.1021/acsmedchemlett.9b00686>

Wilk A, Hayat F, Cunningham R, Li J, Garavaglia S, Zamani L, **Ferraris DM**, Sykora P, Andrews J, Clark J, Davis A, Chaloin L, Rizzi M, Migaud M, Sobol RW (2020) *Extracellular NAD⁺ enhances PARP-dependent DNA repair capacity independently of CD73 activity* **SCIENTIFIC REPORTS**, vol. 10, 651, ISSN: 2045-2322, <https://doi.org/10.1038/s41598-020-57506-9>

Ferraris DM, Miggiano R, Watanabe S, Rizzi M. (2019) *Structure of Thermococcus litoralis trans-3-hydroxy-L-proline dehydratase in the free and substrate-complexed form* **BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS**, vol. 516, p. 189-195, ISSN: 0006-291X, <https://doi.org/10.1016/j.bbrc.2019.06.021>

Rossi F, Miggiano R, **Ferraris DM**, Rizzi M (2019) *The synthesis of kynurenic acid in mammals: an updated kynurenine aminotransferase structural KATalogue* **FRONTIERS IN MOLECULAR BIOSCIENCES**, ISSN: 2296-889X, <https://doi.org/10.3389/fmolb.2019.00007>

Singh, Vinayak S, Pacitto A, Donini S, **Ferraris DM**, Sándor B, Eszter I, Bálint S, Rizzi M, Blundell TL, Ascher DB, Pato J, Mizrahi V (2019) *Synthesis and Structure–Activity relationship of 1-(5-isoquinolinesulfonyl) piperazine analogues as inhibitors of Mycobacterium tuberculosis IMPDH* **EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY**, vol. 174, p. 309-329, ISSN: 0223-5234, <https://doi.org/10.1016/j.ejmech.2019.04.027>

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<https://doi.org/10.3390/pathogens7010017>

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Sahu NU, Singh V, Ferraris DM, Rizzi M, Kharkar PS (2018) *Hit discovery of Mycobacterium tuberculosis inosine 5'-monophosphate dehydrogenase, GuaB2, inhibitors* **BIOORGANIC & MEDICINAL CHEMISTRY LETTERS**, vol. 28, p. 1714-1718, ISSN: 0960-894X, <https://doi.org/10.1016/j.bmcl.2018.04.045>

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Donini S, Garavaglia S, **Ferraris DM**, Miggiano R, Mori S, Shibayama K, Rizzi M (2017) *Biochemical and structural investigations on phosphoribosylpyrophosphate synthetase from Mycobacterium smegmatis* **PLOS ONE**, vol. 12, ISSN: 1932-6203, <https://doi.org/10.1371/journal.pone.0175815>

Ferraris DM, Ralf Spallek, Wulf Oehlmann, Mahavir Singh, Menico Rizzi (2015) *Structures of citrate synthase and malate dehydrogenase of Mycobacterium tuberculosis* **PROTEINS**, vol. 83, p. 389-394, ISSN: 0887-3585, <https://doi.org/10.1002/prot.24743>

Ferraris DM, Ralf Spallek, Wulf Oehlmann, Mahavir Singh, Menico Rizzi (2014) *Crystal structure of the Mycobacterium tuberculosis phosphate binding protein PstS3* **PROTEINS**, vol. 9, p. 2268-2274, ISSN: 0887-3585, <https://doi.org/10.1002/prot.24548>

Mori M, **Ferraris DM**, Rizzi M, Botta M (2014) *Discovery of the first potent and selective Mycobacterium tuberculosis Zmp1 inhibitor* **BIOORGANIC & MEDICINAL CHEMISTRY LETTERS**, ISSN: 0960-894X, <https://doi.org/10.1016/j.bmcl.2014.04.004>

Heilemann M, Dietz M, Haße D, **Ferraris DM**, Göhler A, and Niemann HH (2013) *Single-molecule photobleaching reveals MET receptor dimerization upon ligand binding in intact cells* **BMC BIOCHEMISTRY**, ISSN: 1471-2091, <https://doi.org/10.1186/2046-1682-6-6>

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Ferraris DM, Sbardella D, Petrera A, Marini S, Amstutz B, Coletta M, Sander P, Rizzi M (2011) *Crystal structure of Mycobacterium tuberculosis ZMP1, a metalloprotease involved in pathogenicity* **JOURNAL OF BIOLOGICAL CHEMISTRY**, ISSN: 1083-351X, <https://doi.org/10.1074/jbc.M111.271809>

Ferraris DM, Gherardi E, Di Y, Heinz DW, Niemann HH (2010) *Ligand-Mediated Dimerization of the Met Receptor Tyrosine Kinase by the Bacterial Invasion Protein InlB* **JOURNAL OF MOLECULAR BIOLOGY**, vol. 395, p. 522-533, ISSN: 1089-8638, <https://doi.org/10.1016/j.jmb.2009.10.074>

Niemann HH, Jäger V, P. Butler PJG, Van den heuvel J, Schmidt S, **Ferraris D**, Gherardi E, Heinz DW (2007) *Structure of the Human Receptor Tyrosine Kinase Met in Complex with the Listeria Invasion Protein InlB* **CELL**, vol. 130, p. 235-246, ISSN: 0092-8674, <https://doi.org/10.1016/j.cell.2007.05.037>